

CLAIMS

What is claimed is:

1. A method for dicing a semiconductor substrate, comprising:
at least partially severing the semiconductor substrate along a first street;
at least partially severing the semiconductor substrate along a second street that extends substantially the same direction as the first street and is spaced a first distance apart from the first street; and
at least partially severing the semiconductor substrate along a third street extending in substantially the same direction as the first and second streets, the third street spaced a second distance from the second street without another cut between the second and third streets, the second distance being different than the first distance.
2. The method of claim 1, further comprising forming a scribe line along the first street.
3. The method of claim 2, wherein the forming the scribe line precedes the at least partially severing the semiconductor substrate along the first street.
4. The method of claim 1, further comprising forming a scribe line along the second street.
5. The method of claim 4, wherein the forming the scribe line precedes the at least partially severing the semiconductor substrate along the second street.
6. The method of claim 1, further comprising forming a scribe line along the third street.

7. The method of claim 6, wherein the forming the scribe line precedes the at least partially severing the semiconductor substrate along the third street.
8. The method of claim 1, wherein the at least partially severing the semiconductor substrate along the first and second streets is effected substantially simultaneously.
9. The method of claim 8, wherein the at least partially severing the semiconductor substrate along the first and second streets is effected at a different time than the at least partially severing the semiconductor substrate along the third street.
10. The method of claim 9, wherein the at least partially severing the semiconductor substrate along the third street is effected independently of at least partially severing the semiconductor substrate at any other location.
11. The method of claim 1, further comprising repeating a sequence of the at least partially severing the semiconductor substrate along each of the first, second, and third streets.
12. The method of claim 1, further comprising at least partially severing the semiconductor substrate along another street spaced a third distance apart from an adjacent one of the first, second, or third streets.
13. The method of claim 1, wherein at least partially severing the semiconductor substrate along at least one of the first, second, and third streets comprises substantially severing the semiconductor substrate.
14. The method of claim 13, wherein at least partially severing the semiconductor substrate along each of the first, second, and third streets comprises substantially severing the semiconductor substrate.

15. A method for dicing a semiconductor substrate, comprising:
at least partially severing the semiconductor substrate at a first substantially linear location;
at least partially severing the semiconductor substrate at a second substantially linear location
which extends in substantially the same direction as the first substantially linear location
and is spaced a first distance apart from the first substantially linear location; and
at least partially severing the semiconductor substrate at a third substantially linear location
extending in substantially the same direction as the first and second substantially linear
locations and spaced apart from the second substantially linear location a second distance
which is different from the first distance, no intervening sever that extends in
substantially the same direction as the third substantially linear location being located
between the second and third substantially linear locations.

16. The method of claim 15, wherein at least partially severing the semiconductor
substrate at at least one of the first, second, and third substantially linear locations comprises
substantially severing the semiconductor substrate.

17. The method of claim 16, wherein at least partially severing the semiconductor
substrate at each of the first, second, and third substantially linear locations comprises
substantially severing the semiconductor substrate.

18. The method of claim 16, further comprising forming a scribe line at at least one
location of the first, second, and third substantially linear locations prior to at substantially
severing the semiconductor substrate at the at least one location.

19. The method of claim 15, wherein at least partially severing the semiconductor
substrate at the first substantially linear location and at least partially severing the semiconductor
substrate at the second substantially linear location are effected substantially simultaneously.

20. The method of claim 19, wherein at least partially severing the semiconductor substrate at the third substantially linear location is effected at a different time than at least partially severing the semiconductor substrate at the first and second substantially linear locations.

21. The method of claim 20, wherein at least partially severing the semiconductor substrate at the third substantially linear location is effected independently of at least partially severing the semiconductor substrate at any other location.

22. The method of claim 15, further comprising repeating the substantially severing.

23. The method of claim 15, further comprising at least partially severing the semiconductor substrate at another substantially linear location spaced a third distance apart from an adjacent one of the first, second, and third substantially linear locations.

24. A semiconductor substrate singulation saw, comprising: ✓
a substrate support, the substrate support including a substantially planar surface; and
at least two substantially parallel saw blades having respective centers of rotation along a substantially common axis when in a cutting position and supported above the substrate support so as to cut into a semiconductor substrate positioned thereon without intersecting a plane defined by the substantially planar surface, at least one blade of the at least two substantially parallel saw blades being laterally translatable relative to at least one other of the at least two substantially parallel saw blades.

25. The semiconductor substrate singulation saw of claim 24, wherein the at least one saw blade is raisable relative to another of the at least two substantially parallel saw blades.

26. The semiconductor substrate singulation saw of claim 24, wherein the at least two substantially parallel saw blades are independently rotatable relative to one another.

27. The semiconductor substrate singulation saw of claim 24, wherein the substrate support is translatable in at least one direction relative to the at least two substantially parallel saw blades.

28. The semiconductor substrate singulation saw of claim 24, wherein the at least two substantially parallel saw blades are translatable in at least one horizontal direction relative to the substrate support.

29. The semiconductor substrate singulation saw of claim 24, wherein the at least one blade is laterally translatable substantially perpendicular relative to substantially parallel paths to be cut into the semiconductor substrate by the at least two substantially parallel saw blades.

30. An apparatus for singulating a semiconductor substrate, comprising:
a substrate support; and
at least two substantially parallel saw blades above the substrate support, at least one of the substrate support and the at least two substantially parallel saw blades being laterally translatable relative to the other, at least one of the at least two substantially parallel saw blades being laterally translatable relative to another of the at least two substantially parallel saw blades.

31. The apparatus of claim 30, wherein at least one of the at least two substantially parallel saw blades is raisable with respect to another of the at least two substantially parallel saw blades.

32. The apparatus of claim 30, wherein the substrate support comprises a substantially planar surface.

33. The apparatus of claim 32, wherein each of the at least two substantially parallel saw blades is oriented so as to cut into a semiconductor substrate positioned on the substantially planar surface without intersecting a plane of the substantially planar surface.

34. The apparatus of claim 30, wherein at least one of the at least two substantially parallel saw blades is independently rotatable relative to another of the at least two substantially parallel saw blades.

35. The apparatus of claim 30, wherein the substrate support is translatable in at least one direction relative to the at least two substantially parallel saw blades.

36. The apparatus of claim 30, wherein the at least two substantially parallel saw blades are translatable in at least one direction relative to the substrate support.

37. An apparatus for singulating a semiconductor substrate, comprising:
a substrate support; and
at least two substantially parallel saw blades positioned above the substrate support, at least one of the substrate support and the at least two substantially parallel saw blades being laterally translatable relative to the other, at least one of the at least two substantially parallel saw blades being independently raisable with respect to another of the at least two substantially parallel saw blades.

38. The apparatus of claim 37, wherein at least one of the at least two substantially parallel saw blades is laterally translatable relative to another of the at least two substantially parallel saw blades.

39. The apparatus of claim 37, wherein the substrate support comprises a substantially planar surface.

40. The apparatus of claim 39, wherein each of the at least two substantially parallel saw blades is oriented so as to cut into a semiconductor substrate positioned on the substantially planar surface without intersecting a plane of the substantially planar surface.

41. The apparatus of claim 37, wherein at least one of the at least two substantially parallel saw blades is independently rotatable relative to another of the at least two substantially parallel saw blades.

42. The apparatus of claim 37, wherein the substrate support is translatable in at least one direction relative to the at least two substantially parallel saw blades.

43. The apparatus of claim 37, wherein the at least two substantially parallel saw blades are translatable in at least one direction relative to the substrate support.